Steam Power and Millwork: By GEO. W. SUTCLIFFE. Whittaker & Co., London; Macmillan & Co., New York. 12mo, pp. xv. 886. 1895. $4.50.

This book is one of the excellent series for specialists published recently by this firm, and is a very good example of the kind of work now coming to be so common in technical departments. It is written for those who are interested in the design, manufacture and use of steam engines, mill machinery and similar apparatus, and presumably represents the condensed experience of its author. The book gives valuable information relative to the most modern systems of production and transmission of power, and the latest forms of engine boilers and transmitting mechanisms, and their details, including also instructions regarding their proportions and for their maintenance. The 157 illustrations are numerous and good, representing every essential detail of which description is given. Numerous tables are distributed through the pages of text, and afford a condensed presentation of facts and data required in the computation of designs. The discussion relates principally to the steam engine; but considerable space is given to rope and other transmissions, and the customary forms of power-transmission by the older methods. References are freely given, and the book is thus made, not only intrinsically valuable, but a key to the extensive literature of its subject and field. The book will prove an excellent contribution to the library, especially of the young engineer.

R. H. T.

NOTES AND NEWS.

JOINTS IN THE VERTEBRATE SKELETON.

IN the last number of the *Archiv für Entwickelungsmechanik der Organismen* is the completion of Gustav Tornier's elaborate investigation upon 'The Origin of the Forms of the Joints in the Vertebrate Skeleton.' The writer is apparently unaware of the work which has been done upon the same subject by Ryder, Cope and others in this country, and his conclusions are therefore of all the greater interest since, while independently reached, they are in accord with the American Neo-Lamarckians so far as the adaptive power of individual reaction is concerned. He concludes as follows: The forms of the joints arise by the adaptation of the organism to external conditions of life, and are the results of mechanical influences which are directed upon the joint apparatus by the action of the muscular system. These mechanical stimuli act directly upon the joints, and lead not through the reproductive cells, but directly through the transformation of those parts of the body which are under these changing influences. Joints, therefore, arise according to the principle announced by Wilhelm Roux of 'functional adaptation,' and of the 'self formation of the useful,' 'of adaptation of the organism to functions through the exercise of these functions.' Since comparative anatomy affords the surest tests of the truth of these principles, proofs which have not had their inspiration in Roux's declarations, but have led a long way toward them and are still showing the application of these principles in questions of theoretical evolution, how useful it would be were these principles also extended into other fields of research! At the same time these proofs indicate that comparative anatomy united with pathology present two of the routes by which this goal can and will be reached. This number also contains the experimental studies in teratogeny by Mitrophanow, and a continuation of Driesch's experimental work.

This journal has become the medium of publication of the new school in Germany which revolts against the extreme to which Weismann has carried the theory of selection, and represents partly the thought

which is independent of all theories, partly that which, as seen in the above quotation from Tornier's paper, is analogous to American Neo-Lamarckism. It differs from the American school in the cardinal point, however, that judgment is suspended as to the inheritance of acquired characters.

H. F. O.

THE PREPARATION OF ARGON.

Since the announcement, by Lord Rayleigh and Prof. Ramsay, of the isolation of a new constituent of the atmosphere, any information as to the nature of this substance has been received with interest by the scientific world. Guntz has recently described, in the *Comptes Rendus*, a modification of the method used by Rayleigh and Ramsay for its preparation. This author has substituted lithium for magnesium, thereby securing the absorption of the nitrogen more readily at a lower temperature. The preparation of pure lithium in quantity has hitherto been a difficult problem, but Guntz has devised a simple method for its preparation in large quantities.

This consists in the electrolytic decomposition of a mixture of equal parts of lithium chloride and potassium chloride, the latter being introduced to lower the temperature at which the decomposition takes place. The decomposition is carried on in porcelain crucibles and the molten lithium poured into molds. It is free from iron and silica, but contains a small amount of potassium chloride.

The experiment showing the presence of argon in atmospheric nitrogen and its absence from chemical nitrogen, the latter term being used for nitrogen obtained from chemical substances by decomposition, consists in introducing the nitrogen into a glass tube containing the lithium in a boat. The glass tube is connected with a manometer to show the change in pressure. Upon heating the metal to dull redness, combination of the nitrogen and lithium takes place with incandescence. The manometer after the operation shows a pressure of about 10 mm. Upon introducing another volume of nitrogen and repeating the operation about the same amount of argon is obtained, and this process can be continued until the tube is filled with argon. If, however, chemical nitrogen is used there is total absorption, showing that atmospheric nitrogen contains some constituents not present in chemical nitrogen.

J. E. Gilpin.

HELION.

Prof. Ramsay has kindly sent us the following abstract of his paper on 'Helion, a Gaseous Consistent of certain Minerals.' Part I., received by the Royal Society on April 27th:

An account is given of the extraction of a mixture of hydrogen and helion from a felspathic rock containing the mineral clèveite. It is shown that in all probability the gas described in the preliminary note of March 26 was contaminated with atmospheric argon.

The gas now obtained consists of hydrogen, probably derived from some free metal in the felspar, some nitrogen and helion. The density of helion, nearly free from nitrogen, was found to be 3.89. From the wave-length of sound in the gas, from which the theoretical ratio of specific heats 1.66 is approximately obtained, the conclusion may be drawn that helion, like argon, is monatomic. Evidence is produced that the gas evolved from clèveite is not a hydride, and a comparison is made of the spectra of argon and helion. There are four specially characteristic lines in the helion spectrum which are absent from that of argon; they are a brilliant red, the D_3 line of a very brilliant yellow, a peacock-green line, and a brilliant violet line. One curious fact is that the gas from clèveite, freed from all

impurities removable by sparking with oxygen in presence of caustic potash, exhibits one, and only one, of the characteristic bright red pair of argon lines. This, and other evidence of the same kind, appears to suggest that atmospheric argon and helion have some common constituent.

Attention is drawn to the fact that on subtracting 16 (the common difference between the atomic weights of elements of the first and second series) from 20, the approximate density of argon, the remainder is 4, a number closely approximating to the density of helion; or, if 32 be subtracted from 40, the atomic weight of argon if it be a monatomic gas, the remainder is 8, or twice the density of helion, and its atomic weight if it too is a monatomic gas.

GRAVITY MEASUREMENTS.

AT a meeting of the Philosophical Society of Washington on March 16th Mr. G. K. Gilbert discussed the gravity determinations reported by Mr. G. R. Putnam, an account of which is given elsewhere in the present number of SCIENCE. Mr. Gilbert summarizes his conclusions as follows:

"The measurements of gravity appear far more harmonious when the method of reduction postulates isostacy than when it postulates high rigidity. Nearly all the local peculiarities of gravity admit of simple and rational explanation on the theory that the continent as a whole is approximately isostatic, and that the interior plain is almost perfectly isostatic. Most of the deviations from the normal arise from excess of matter and are associated with uplift. The Appalachian and Rocky mountains and the Wasatch plateau all appear to be of the nature of added loads, the whole mass above the neighboring plains being rigidly upheld. The Colorado plateau province seems to have an excess of matter, and the Desert Range province may also be overloaded. The fact that the six stations from Pike's Peak to Salt Lake City, covering a distance of 375 miles, show an average excess of 1,345 rock-feet indicates greater sustaining power than is ordinarily ascribed to the lithosphere by the advocates of isostacy. It indicates also that the district used in this discussion for estimating the height of the mean plain is far too small; even the radius of 100 miles selected by Mr. Putnam may not be large enough."

GENERAL.

IN a paper read before the Paris Academy on April 29th MM. Hericourt and Ch. Richet announce that they have applied the method of injecting serum in the treatment of cancer. Two patients only have undergone this treatment, one of whom is said to have been completely cured.

REV. J. M. SEELYE, president of Amherst College from 1877 to 1890, died at Amherst on May 12th, at the age of seventy. For nineteen years before his election to the presidency he filled the chair of mental and moral philosophy and retained this chair until his death. His original contributions to philosophy were not important, but he exercised great influence as an educator and teacher.

WE learn that Deputy Surgeon-General John S. Billings, of the army, has requested that he be placed on the retired list; and that in October that distinguished officer will leave the Army Medical Museum, of which he is curator, and the Library of the Surgeon-General's Office, of which he is librarian, and these magnificent institutions, that have been made what they are largely by his ability and zeal, will know him no longer. Before the date he has selected for his retirement he hopes to complete his work on the final volume of the Index Catalogue. In seeking official retirement Dr. Billings does not propose to give up work, as he has accepted the chair of

hygiene in the University of Pennsylvania. —*N. Y. Medical Record.*

Dr. Carl Thiersch, professor of surgery in the University of Leipsic, died on April 20th at the age of seventy-three. He was appointed professor of surgery at Erlangen in 1854, and in 1867 proceeded to Leipsic. During the Franco-Prussian war he was attached as senior surgeon to the 12th Army Corps. He was the author of standard works on cholera and embryology.

The number of medical journals at present published in Russia is 38. Of these 20 are published in St. Petersburg, 5 at Moscow, 4 at Warsaw, 2 at Odessa, 2 at Charkoff, and 1 at Kasan, Kieff, Saratoff, Woronesz and Pultawa, respectively. The oldest of them all is the *Medizinskoie Obozrenie*, which is twenty-one years old; next comes the *Russkaia Medizina*, which is in its nineteenth year; the *Vratch*, which is in its fifteenth, being third.—*N. Y. Medical Record.*

We much regret to learn that the publication of *Insect Life* will cease with the next number. Two new series of bulletins will be started from the Division of Entomology of the Department of Agriculture to take its place. The one will contain articies of a general economic and biological character —practically such articles as have been published most frequently in *Insect Life*— and the other will contain results of the purely scientific work of the office force.

There has been established in Leicester, England, a bacteriological institution under the direction of a medical officer in the interests of anti-vaccination.

Edward Burnett Tylor, M. A., Reader in Anthropology in the University of Oxford, has been made Professor of Anthropology.

Prof. W. M. L. Coplin, who holds the Chair of Pathology at Jefferson Medical College in Philadelphia, has accepted the call tendered him by the Trustees of Vanderbilt University, Nashville, Tenn., to take charge next fall of the departments of Pathology, Biology and Bacteriology, for which they have just completed a new building.—*N. Y. Evening Post.*

Brigadier General Thomas L. Casey, having reached the age requiring retirement from the active list, has relinquished command of the corps of engineers and charge of the engineer department. He is succeeded by Col. William P. Craighill.

We learn through the *N. Y. Medical Record* that the Medical Department of the State University of Minnesota was granted $40,000 by the Legislature for a laboratory building, making a total of $150,000 appropriated for buildings alone in a period of four years. The medical law was likewise amended to require of all graduates of later date than 1898 'attendance upon four courses of medical lectures, in different years, of not less than six months' duration each.'

The trustees of Williams College have accepted the legacy of $20,000 from Mme. Souberville, in memory of her father, Horace F. Clark, D. D. The College has also received a gift of $3,500 from ex-Governor Pennoyer, of Oregon, to found a scholarship in memory of his son.

Dr. Ernst Ritter, of the University of Göttingen, has been elected Assistant Professor of Mathematics in Cornell University.

The death of Mrs. Henry C. Lewis, of Coldwater, Mich., leaves the art collection possessed by her late husband, valued at $300,000, at the disposal of the University of Michigan. At present the university has not accommodation for the bequest, but President Angell expects an art building to be erected by private contributions. *N. Y. Evening Post.*

An exhibition of California food products will be held in Berlin from the 5th of May to the 5th of July.

THE *Scientific American* for May 11th contains an interesting illustrated account of Purdue University, Lafayette, Indiana.

THEODOR JOHANN CHRISTIAN AMBDERS BRORSEN, the astronomer, died on April 3d at Norburg in Schleswig at the age of 76. He was director of the observatory of Seuftenberg for twenty years.

THE death is announced, at the age of 64, of James Price, President of the Society of Civil Engineers of Ireland, Professor in the University of Dublin and Engineer in Chief of the Midland and Great Western Railway Company.

THE third International Congress of Zoölogy at Leyden is divided into six sections, as follows: (1) General Zoölogy, Geographical distribution, including fossil faunas. (2) Classification of Vertebrates, Geographical distribution. (3) Comparative Anatomy of Vertebrates, living and fossil. Embryology. (4) Classification of Invertebrates, Geographical distribution. (5) Entomology, (6) Comparative Anatomy and Embryology of the Invertebrates.

THE Craven Studentship at Cambridge has been awarded to Mr. R. C. Bosanquet. This is an endowment for advanced studies abroad in the languages, literature, history, archæology, or art of ancient Greece or Rome, or the comparative philology of the Indo-European languages.

IN a demurrer filed by Mrs. Jane L. Stanford in the United States Circuit Court at San Francisco it is contended that, since no valid claim was ever presented to Leland Stanford during his life or to his widow since his death, any claim the United States Government might have had on the Stanford estate is vitiated.

HON. ECKLEY B. COXE, a prominent mining engineer and writer, at one time President of the American Institute of Mining Engineers, died at Hazleton, Pa., at the age of fifty-four years.

BRIGADIER GENERAL CHARLES SUTHERLAND, formerly Surgeon-General of the Army, died at Washington, on May 11th, at the age of sixty-five years.

THE first *conversazione* of the Royal Society for the season was held on the evening of May 1st in Burlington-house, and there was a very large attendance of guests. The exhibits were exceptionally numerous, electric science and applied mathematics being well represented, while some interesting exhibits were also shown in the department of chemistry, astronomy and biology.—*London Times.*

PRINCIPAL PETERSON, of Dundee College, has been offered the presidency of McGill University, Montreal.

DR. J. H. HYSLOP has been made professor of logic and ethics in Columbia College, and Dr. Frederick S. Lee, adjunct professor of physiology.

LÉOPOLD TROUVELOT died on April 22d at the Observatory of Meudon at the age of 68. After the *coup d'état* he left France and came to America, living in Cambridge until 1882. His first published work appeared in Boston in 1866. At this time he was a student of natural history, but later he obtained a position as astronomer at Harvard College. His most important work was on the planet Venus, published in 1892. He was well known for his drawings, many of which still remain unpublished. He leaves an unfinished memoir on the planet Mars, and at the time of his death was engaged on a study of Jupiter.

DR. JOHN W. BYRON, who died on May 8th at the age of 34, was known for his researches in bacteriology carried out at Havana during the yellow-fever epidemic, later in the laboratories of Berlin and Paris, and during the last five years in the Loomis Laboratory, where he occupied the position of bacteriologist. Dr. Byron is said to have contracted the disease of which he died in

carrying out his experiments on tubercle bacilli.

The American Forestry Association proposed holding its annual peripatetic meeting in southern New Jersey from May 16th to May 19th. The privileges of this expedition are open to all members of the American Forestry Association, New Jersey Forestry Association and Pennsylvania Forestry Association. On May 15th Prof. B. E. Fernow was to deliver an illustrated lecture at Camden, from which place the party would start, going down the Delaware by steamboat, visiting all places of interest along the shore from Cape May to Atlantic City and in the pines. On the evening of May 17th an illustrated lecture was to be delivered in Atlantic City by Prof. Joseph Rothrock, Forestry Commissioner for Pennsylvania.

At a meeting of the Fellows of the Royal Botanical Society held in the Societies' gardens at Regent's Park, London, the question of the desirability of opening the gardens to the public on Bank holidays was discussed. It was stated at the same meeting that unless some fresh source of income could be obtained the gardens could not be kept up.

At the spring meeting of the Iron and Steel Institute the Bessemer gold medal of 1895 was unanimously awarded to Henry Marion Howe, of Boston, in recognition of his contributions to metallurgical literature. Among the previous recipients of the medal were Peter Cooper, Abram S. Hewitt, Alexander L. Holley and John Fritz. Mr. Howe's most important work is a treatise on the 'Metallurgy of Steel,' which was published in 1890 and for which he received a prize of $500 from the Société d' Encouragement of Paris.

The 66th anniversary meeting of the Zoölogical Society of London was held on April 29th. The chair was taken by Sir William H. Flower. The report of the Council stated that the silver medal had been awarded to Mr. Henry H. Johnston, Commissioner for British Central Africa, for his distinguished services to all branches of natural history. The total receipts of the Society for 1894 amounted to £25,107, a decrease of £1,110 being attributed to the unfavorable weather of the past year. The expenditure amounted to £23,616, a decrease of £1,661. The number of animals in the Zoölogical Gardens on December 31st last was 2,563, of which 669 were mammals, 1,427 birds and 467 reptiles. About 30 species of mammals, 12 of birds and one of reptiles had bred in the gardens during last summer. Sir William H. Flower was re-elected president.—*London Times.*

SOCIETIES AND ACADEMIES.

SCIENTIFIC SOCIETIES OF WASHINGTON.

A joint meeting of the Scientific Societies of Washington was held May 10th, on the occasion of the delivery of the annual address of the President of the National Geographic Society, Hon. Gardiner G. Hubbard. Dr. G. Brown Goode presided, and in the introductory remarks briefly outlined the development of the Societies and their joint commission.

Mr. Hubbard's subject was 'Russia.' He considered it in the light of his own observations while making an extensive journey through that country in 1881. Its climate, physiographic features, government and the customs and conditions of its people were all graphically portrayed. At the close of the address a series of views were shown upon the screen.

In response to a motion by Prof. Simon Newcomb, seconded by Postmaster General Wilson, the large audience gave Mr. Hubbard a hearty vote of thanks for his address.

J. S. Diller, *Secretary.*

BIOLOGICAL SOCIETY OF WASHINGTON.

At the meeting on May 4th, Mr. Charles Torrey Simpson read a paper 'On the Geo-